Command Line Interface

for 12000 and 4000 BACs, Micro DSLAMs, and Network Extenders

User's Guide

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About This Guide

Document Purpose and Intended Audience

This guide describes the use of the Command Line Interface (CLI) for Network Extenders, micro DSLAMs, and interface modules in 12000/4000 Broadband Access Concentrators.

Document Summary

Section	Description
Chapter 1, CLI Overview	Provides background information about the devices that use the CLI.
Chapter 2, COM Port Connection	Describes how to connect a PC to the COM port of your DSLAM or Network Extender.
Chapter 3, CLI Commands	Describes the CLI commands.
Index	Lists key terms, concepts, and sections in alphabetical order.

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CLI Overview

1

Command Line Interface

Paradyne's 12000/4000 Series Broadband Access Concentrators, micro DSLAMs, and Network Extenders can be managed with a Command Line Interface (CLI) through either a direct PC to DSLAM COM (Communication) Port connection or from a remote network connection via Telnet.

System Requirements

- **Straight-Through RJ45 to RJ45 Ethernet Cable**
  Required for establishing a direct connection from the COM port to your PC for initial configuration via CLI.
- **DB9 Female to RJ45 Male Adapter**
  Required for conversion of your PC's RS232 serial port for use with an RJ45 to RJ45 Ethernet cable. Included with select devices.
- **Terminal Emulator**
  Required for running CLI. Any standard terminal emulator currently on the market will serve the purpose; there are no specific program requirements.
- **Telnet Tool**
  Required for remote management with CLI. Microsoft Windows Operating Systems (1998, 2000, NT and XP) include a Telnet tool which is run through the Windows command prompt (cmd.exe). If you are using an operating system other than Windows, you may need to install a Telnet tool. Any standard Telnet tool currently on the market will serve the purpose; there are no specific program requirements.
- **Trivial File Transfer Protocol (TFTP) Tool**
  Required for downloading firmware updates and for saving DSLAM configurations to local files for backup and/or template use. Any standard TFTP tool will serve the purpose; there are no specific program requirements.

Multi-User Support

Up to 10 CLI connections can run concurrently: 1 direct connection via the COM Port and up to 9 remote connections via Telnet. There are two classes of CLI users: Superuser (read/write), and General User (read only). Both classes may be logged in simultaneously.

Default Settings

No configuration is necessary for a DSLAM or Network Extender to operate at default settings.

CLI User Access Defaults

- **Read Only:**

Username: "general"
Password: "Password"

- **Read/Write:**

Username: "superuser"
Password: "Password"

System Defaults

- **IP Address**

IPD12000 Slot 13*:	192.168.254.252	*As a method of preventing duplicate IP Address conflicts, default IP Addresses for the IPD12000 are configured according to the slot location of the Multiplexer Uplink Modules (MUMs).
IPD12000 Slot 14*:	192.168.254.253	
IPD4000 Slot 5:	192.168.254.252	
Micro DSLAM:	192.168.254.252	

- **Other System Parameters**

Gateway:	0.0.0.0
Inband Management:	disabled
Inband Management VLAN ID:	0 (off)
Management IP Address Range:	0.0.0.0 - 255.255.255.255 (all)
Subnet Mask:	255.255.255.0
System Name:	[MUM or Micro DSLAM Model Name]
Telnet:	enabled
TFTP:	enabled
Web Server (NMS):	enabled

Port Defaults

Circuit Identification*:	n/a (no default)	*These parameters cannot be configured via CLI; they are configurable only with Simple Network Management Protocol (SNMP) and Paradyne's Network Management System (NMS).
Backbone-VLAN:	0 (off)	
Flood:	Uplink	
IP Range 1*:	0.0.0.0 - 255.255.255.255	
IP Range 2*:	0.0.0.0 - 0.0.0.0	
Protocol*:	all traffic	
VLAN Priority:	0 (none)	
VLAN Range:	0-0 (off)	

Device Memory

Configuration backup is inherent in Micro DSLAMs and IP DSLAMs. Upon initial power up, default parameters will remain in place unless changed through CLI, SNMP (Simple Network Management Protocol) or NMS (Paradyne's Network Management System). Once changed, new configurations will automatically be recorded in both RAM and NVRAM:

- **RAM (Random Access Memory)**
  Data stored in RAM will be erased if the device loses power.
- **NVRAM (Non-Volatile Random Access Memory)**
  Data stored in NVRAM will remain intact (even if the device loses power) unless deliberately cleared or reconfigured.

Local Files

Both system and port configurations can be saved on your PC or local network as a backup and/or for use as a template for future configurations. Once a DSLAM has been configured as desired, the settings can be uploaded (from the DSLAM to a local file) through a Trivial File Transfer Protocol (TFTP) tool with a GET command and the following information:

- **Backup File**
  A DSLAM backup file records all system and port configurations.

Item	Data Needed for Backup	Example
Host Name:	DSLAM IP Address (xxx.xxx.xxx.xxx)	185.172.164.144
Remote Filename:	NVR_BACKUP.BIN.[superuser password]	nvr_backup.bin.Password
Local Filename:	user preference	dslam27_mum13_backup.bin

- **Template File**
  A DSLAM template file records all system and port configurations except IP address.

Item	Data Needed for Template	Example
Host Name:	DSLAM IP Address (xxx.xxx.xxx.xxx)	185.172.164.144
Remote Filename:	NVR_CFG.BIN.[superuser password]	nvr_cfg.bin.Password
Local Filename:	user preference	n2n_dslam12000_template.bin

Configuration files can also be flash downloaded from a local file to a DSLAM. Replace the GET command with a PUT command. Refer to your TFTP user manual for further instruction.

IP DSLAM Data Management

Replacing an Interface Module

A replacement module (of like model) will take on the same configurations as the previous module only if the Multiplexer Uplink Module (MUM) remains in the chassis and the chassis retains power during the interim. Otherwise replacement module configurations will revert to original default settings.

If the replacement interface module is:	Then the module configuration will revert to:
The same model as the previous module and new or unconfigured	The same configurations as the previous module
The same model as the previous module and already configured	The same configurations as the previous module
A different model than the previous module and new or unconfigured	Original default settings (see *Default Settings* on page 1-2)
A different model than the previous module and already configured	Original default settings (see *Default Settings* on page 1-2)

Replacing a Multiplexer Uplink Module (MUM)

Paradyne recommends clearing the NVRAM of a previously configured MUM before using it as a replacement in a different chassis. Once NVRAM has been cleared, the MUM will revert to original default settings.

If the replacement MUM is:	Then chassis and interface module configurations will revert to:
The same model as the previous MUM and new or unconfigured	The same configurations as the previous MUM
A different model than the previous MUM and new or unconfigured	The same configurations as the previous MUM

A replacement MUM will take on the same configurations as the previous MUM only if there is at least one interface module installed in the IP DSLAM and the IP DSLAM retains power during the interim. Otherwise, the replacement MUM will revert to original default settings.

System Reset/Reboot

A system reset clears Micro DSLAM or IP DSLAM interface module RAM. It does not clear NVRAM; system and port settings remain as configured. A system reset takes approximately one minute to complete, after which you will be required to log back in.

Manual Reset

- **Micro DSLAM**
  Using a paperclip, mechanical pencil or similar tool, press the Reset Button on the chassis faceplate once.
- **IP DSLAM**
  - — Single Card: Slide the card you want to reset out of the DSLAM chassis far enough to disengage the module connector at the back of the chassis. Ensure the power LED on the card's faceplate is no longer illuminated and wait 10 seconds before sliding the card back into the chassis.
  - — All cards in DSLAM: Power down the DSLAM chassis and wait 10 seconds before restoring power. This resets all chassis interface modules in addition to the MUM2000-2 or BSX8000-5.

Reset Via CLI

To reset a device with the CLI, use the Reset command. See *Reset* in Chapter 3, *CLI Commands*.

Clearing NVRAM

Clearing NVRAM on the IP DSLAM or Micro DSLAM restores all system and port configurations to original default settings.

Manual Clear

- **Micro DSLAM**
  Using a paperclip, mechanical pencil or similar tool, press the Reset Button on the chassis faceplate once. After approximately 2 seconds, the green Link LEDs will flash from port 1 to port 5. Immediately hit the reset button again. After the Micro DSLAM reboots, NVRAM will be cleared.
- **IP DSLAM**
  Remove all cards from the DSLAM chassis. Reinstall the management card (MUM2000-2 or BSX8000-5) alone. Wait at least one minute, then install the other cards.

Clear NVRAM Via CLI

To clear NVRAM with the CLI, use the Clear command. See *Clear NVRAM* in Chapter 3, *CLI Commands*.

COM Port Connection

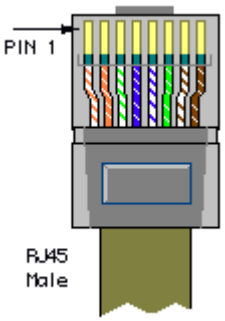
2

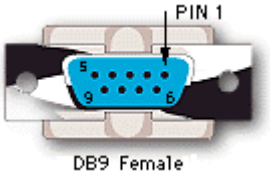
Connecting a PC

Initial configuration using the CLI requires a direct physical connection from your PC to the COM port of the DSLAM, management card, or Network Extender you are configuring. (However, the web interface is recommended for subsequent configuration.)

▶ Procedure

1. Plug the provided DB9 to RJ45 adapter into the RS232 serial port on your PC. The adapter pinout is as follows:





Pin	RJ45 Port		Direction	PC RS232 Serial Port	
1	Transmit Data	TxD	→	RxD	Receive Data
2	Data Set Ready	DSR	←	RTS	Request to Send
3	Clear to Send	CTS	←	DTR	Data Terminal Ready
4	Receive Data	RxD	←	TxD	Transmit Data
5	Ground	GND	↔	GND	Ground
6	Data Terminal Ready	DTR	→	CTS	Clear to Send
7	Request to Send	RTS	→	DSR	Data Set Ready
8	No Connect	NC		DCD	Data Carrier Detect

2. Connect one end of a straight-through RJ45 to RJ45 Ethernet cable into the adapter plugged into your PC, and the other end of the cable into the RJ45 COM port of the Micro DSLAM, management card, or Network Extender.

Launching Your Terminal Emulator

Launch the Terminal Emulator on your PC and configure the program settings. Actual configurations will depend upon the Terminal Emulator model type being used, though settings should be modeled after the list below; most are standard defaults. Refer to your Terminal Emulator user manual for further information.

Baud:	9600	Port:	Com 1
Data Bits:	8	Stop Bits:	1
Flow Control:	Software or XON/XOFF	Transmit Delay:	n/a
Parity:	none		

Logging In

Once your Terminal Emulator has been launched, the following information appears on your screen:

```
Net to Net Technologies
Copyright (C) [year]
[product model name] Version [number] (Boot Prom [number])
System Build Date: [date, time, year]
Mac Address: [address], IP Address: [address]
```

This information is followed by a request for username and, once username has been entered, a request for password. You must log in as a superuser in order to make configuration changes.

```
Username:   superuser
Password:   Password
```

CLI Prompt

A command prompt will appear once you have logged in. The CLI command prompt is tied to the DSLAM system name (see *System Name* in Chapter 3, *CLI Commands*). The default system name is the model name of the device into which you are logged.

```
[system name] ->
```

CLI Commands

3

Command Syntax

- Each CLI command must be typed in the sequence shown for that command.
- For all CLI commands requiring a slot number, the slot number should be entered as "1" when configuring Micro DSLAMs and Network Extenders.
- CLI commands are not case sensitive.
- The start and end values of a number range may be separated by either a space (" ") or a dash (" - ").
- A correctly entered command will be mirrored back to you, followed by the requested data and/or a statement indicating the action taken.

Command Errors

Syntax Error
Incorrect syntax (command format) will prompt an error message and the command will not be carried out.

Slot and/or Port Number Error
A command with an incorrect slot and/or port number may not receive an error message and/or may not be mirrored back to you. Incorrect slot and port numbers include slots that are physically empty and slot or port numbers that are beyond the realm of possible options.

Command History

The ten most recently entered CLI commands can be reviewed by pressing the Up Arrow key (↑) and Down Arrow key (↓). Each of these commands can also be altered for reuse: simply backspace on the chosen command line to the point you wish to alter, type the updated information, and press the Enter key.

Back

The Up Arrow key (↑) scrolls back from the most to the least recent of the last ten commands entered.

Forward

The Down Arrow key (↓) Scrolls forward from the least to the most recent of the last ten commands entered.

Disable Commands

The Disable commands disable Telnet, the TFTP server, or web server for the system.

Disable Telnet

The DISABLE_TELNET command disables Telnet access to the device. Telnet is enabled by default on devices that support it.

Example: [system name] ->disable_telnet

Disable TFTP

The DISABLE_TFTP command disables TFTP access to the device. TFTP is enabled by default on devices that support it.

Example: [system name] ->disable_tftp

Disable Web Server

The DISABLE_WEB_SERVER command disables Telnet access to the device. Telnet is enabled by default on devices that support it.

Example: [system name] ->disable_web_server

Enable Commands

The Enable commands enable Telnet, the TFTP server, or web server for the system.

Enable Telnet

The ENABLE_TELNET command enables Telnet access to the device. Telnet is enabled by default on devices that support it.

Example: [system name] ->enable_telnet

Enable TFTP

The ENABLE_TFTP command enables TFTP access to the device. TFTP is enabled by default on devices that support it.

Example: [system name] ->enable_tftp

Enable Web Server

The DISABLE_WEB_SERVER command enables Telnet access to the device. Telnet is enabled by default on devices that support it.

Example: [system name] ->disable_web_server

SET Commands

A SET command is used to configure slots and/or ports, either individually or as groups. The following parameters are configured with SET commands.

System commands:

- IP Address
- Subnet Mask
- Gateway
- CLI Session Timeout
- Inband Management
- Inband Management VLAN ID
- Password
- SNMP Community String
- System Name

Port commands:

- Backbone-VLAN
- Flood
- Priority
- VLAN Range
- ADSL Commands
- SDSL Commands

All SET commands except CLI Session Timeout and System Name must be entered with a slot number. For devices without slots, specify slot 1.

System Configuration

System configurations made to the management card (MUM2000-2 or BSX8000-5) apply to all ports in all slots of the IP DSLAM. System configurations made to the Micro DSLAM apply to all ports on the Micro DSLAM.

Unless your PC has been configured to accept the default system settings, or initial DSLAM configuration has already been completed, you will need to set a proprietary IP Address, Subnet Mask and Gateway. If remote DSLAM management is desired via the CLI, the Network Management System (NMS) and/or Simple Network Management Protocol (SNMP), you must also set Inband Management. Additionally, if your network is running VLANs to facilitate packet direction and/or promote packet security, you must also set Inband MGMT (Management) VLAN ID. If any of these proprietary values are unknown, contact your System Administrator or Information Technology Manager for further information. If you have an IPD12000 with two management cards, system settings for each card must be configured separately.

IP Address

The proper syntax for an IP Address is xxx.xxx.xxx.xxx, where each xxx is a decimal value in the range 0–255. To manage the device using your PC, the assigned IP Address must be in the same subnet as your PC, or you must connect through a router.

[system name] ->SET SLOT [13 or 14 for the IPD12000, 5 for the IPD4000, 1 for the Micro DSLAM] IP_ADDRESS [xxx.xxx.xxx.xxx]

Example: [system name] ->set slot 13 ip_address 193.166.254.98

Default:

Chassis	Default IP Address
IPD12000 Slot 13 IPD4000 Slot 5 All Micro DSLAMs	192.168.254.252
IPD12000 Slot 14	192.168.254.253

Subnet Mask

The proper syntax for a Subnet Mask is xxx.xxx.xxx.xxx, where each xxx is a decimal value in the range 0–255.

[system name] ->SET SLOT [13 or 14 for the IPD12000, 5 for the IPD4000, 1 for the Micro DSLAM] SUBNET_MASK [xxx.xxx.xxx.xxx]

Example: [system name] ->set slot 13 subnet_mask 255.255.255.207

Default: 255.255.255.0

Gateway

The proper syntax for a Gateway is xxx.xxx.xxx.xxx, where each xxx is a decimal value in the range 0–255. The Gateway assigned to your DSLAM must duplicate that of your PC.

[system name] ->SET SLOT [13 or 14 for the IPD12000, 5 for the IPD4000, 1 for the Micro DSLAM] DEFAULT_GATEWAY [xxx.xxx.xxx.xxx]

Example: [system name] ->set slot 13 default_gateway 193.166.254.255

Default: 0.0.0.0

CLI Session Timeout

CLI Session Timeout sets the amount of time a CLI session can sit idle before the user is automatically logged out. Time is represented in seconds; minimum is 30.

[system name] ->SET CLI_SESSION_TIMEOUT [xxx]

Example: [system name] ->set cli_session_timeout 600

Default: 300 seconds (5 minutes)

Inband Management

Inband Management allows remote DSLAM management via the CLI, NMS, and SNMP.

To remotely manage a device using the CLI, Telnet must be enabled.

[system name] ->SET SLOT [13 or 14 for the IPD12000, 5 for the IPD4000, 1 for the Micro DSLAM] INBAND_MANAGEMENT [ON, OFF]

Example: [system name] ->set slot 13 inband_management on

Default: OFF

Inband Management VLAN ID

If your network is running VLANs to facilitate packet direction or promote packet security, you must set Inband MGMT (Management) VLAN ID. Do not set Inband MGMT VLAN ID if your network is not running VLANs.

[system name] ->SET SLOT [13 or 14 for the IPD12000, 5 for the IPD4000, 1 for the Micro DSLAM] INBAND_MGMT_VLAN_ID [0-4085]

Example: [system name] ->set slot 13 inband_mgmt_vlan_id 100

Default: 0

Inband Management VLAN ID applies only to remote network management. It does not apply to direct connections between your PC and the COM port.

Password

Passwords may be up to 15 case-sensitive alphanumeric characters. You will be prompted for values. Only one password may be assigned per each class of user: all general users utilize the same password and all superusers utilize the same password.

General and Superuser passwords cannot be configured remotely via Telnet.

General User (Read Only)

General Users' access to DSLAM management via CLI is limited to the HELP [?], LOGOUT and SHOW commands.

[system name] ->SET SLOT [13 or 14 for the IPD12000, 5 for the IPD4000, 1 for the Micro DSLAM] GENERAL_PASSWORD

Example: [system name] ->set slot 5 general_password
Password: ********
Verify: ********

Default: Password

Superuser (Read/Write)

Superusers have unlimited access to DSLAM management via CLI.

[system name] ->SET SLOT [13 or 14 for the IPD12000, 5 for the IPD4000, 1 for the Micro DSLAM] SUPERUSER_PASSWORD

Example: [system name] ->set slot 5 superuser_password
Password: ********
Verify: ********

Default: Password

SNMP Community String

SNMP community strings may be up to 15 case-sensitive alphanumeric characters. You will be prompted for values. Only one SNMP community string may be assigned per each class of user: all read only users utilize the same community string and all read/write users utilize the same community string.

Read-only and read/write SNMP community strings cannot be configured remotely via Telnet.

Read Only

Read only users are limited to SNMP GET requests.

[system name] ->SET SLOT [13 or 14 for the IPD12000, 5 for the IPD4000, 1 for the Micro DSLAM] SNMP_READONLY_COMMUNITY

Example: [system name] ->set snmp_readonly_community
Community: ********
Verify: ********

Default: Password

Read / Write

Read/Write users have unlimited access to all supported SNMP Managment Information Base (MIB) Object Identifiers (OIDs).

[system name] ->SET SLOT [13 or 14 for the IPD12000, 5 for the IPD4000, 1 for the Micro DSLAM] SNMP_READWRITE_COMMUNITY

Example: [system name] ->set snmp_readwrite_community
Community: ********
Verify: ********

Default: Password

System Name

System Name is a user-defined identifier of up to 32 alphanumeric characters. It replaces model name as the CLI command prompt.

[system name] ->SET SYSTEM_NAME [user defined]

Example: [system name] ->set system_name dslam412_mum13
The command prompt would then appear as:
dslam412_mum13 ->

Default: BSX, MUM, or Micro DSLAM model name

CLI System Name is identified with the first 32 characters of the SNMP MIB-II OID sysName. Configuration of sysName via SNMP changes the CLI command prompt.

Port Configuration

The remainder of SET commands apply to each port within the IP DSLAM or Micro DSLAM individually and may be configured independently for each subscriber line (if so desired).

Backbone-VLAN

A Backbone-VLAN tag is the primary packet identifier. It allows a router with backbone capabilities to make smarter decisions in directing unlearned traffic, by pointing packets to the correct network clouds. Once the packets have made it to the proper network, standard VLAN tags direct the packets to the intended ports.

Packets coming from the . . .	**With . . .**	**Will be . . .**
WAN	Both Backbone-VLAN and VLAN tags	Dropped, regardless of whether the Backbone-VLAN tag is in accordance with current configurations.
WAN	Standard VLAN tags only	Transmitted in accordance with standard VLAN rules (see *VLAN Range* on page 3-10). If the packet adheres to standard VLAN rules and the Backbone-VLAN is currently configured, then a Backbone-VLAN tag will automatically be added to the packet, prior to transmission, along with the configured VLAN ID, configured Priority and a zero [0] CFI bit.
Uplink	Both Backbone-VLAN and VLAN tags	Dropped if the Backbone-VLAN is not currently configured, or if the Backbone-VLAN is configured but the packet's Backbone-VLAN tag does not match the current configuration. If the packet's Backbone-VLAN tag DOES match the current configuration, the packet will follow standard VLAN rules.
Uplink	Standard VLAN tags only	Dropped, if the Backbone-VLAN is currently configured. If the Backbone-VLAN is NOT currently configured, then the packet will follow standard VLAN rules.

A Backbone-VLAN tag cannot be used independently; standard VLAN tags must be set. Additionally, the DSLAM uplink connection for the port being configured must run through a router in order for a Backbone-VLAN tag to function.

Backbone-VLAN = 0-4085
Default: 0 (disabled)

[system name] ->SET SLOT [ALL or 1-12 for the IPD12000, ALL or 1-4 for the IPD4000, 1 for the Micro DSLAM] PORT [ALL or port number] BACKBONE_VLAN [0-4085]

Example: [system name] ->set slot 2 port all backbone_vlan 100

Flood

Flood refers to the method in which interface modules handle unknown unicasts (traffic directed to a single MAC Address), multicasts (traffic directed to multiple MAC Addresses) and broadcasts (traffic directed to all MAC Addresses) for each port. The Institute of Electrical and Electronics Engineers (IEEE) Virtual Local Area Network (VLAN) standard 802.1Q dictates that packets should be forwarded (flooded) if within the VLAN range for that port.

Upl (Uplink - Default)

Unknown unicast, multicast and broadcast traffic is flooded only to the DSLAM's uplink interface ports. This prevents communication between interface ports without the intervention of an upstream device such as a router. If communication between interface ports IS desired, the upstream device must be properly configured to allow it.

[system name] ->SET SLOT [ALL or 1-12 for the IPD12000, ALL or 1-4 for the IPD4000, 1 for the Micro DSLAM] PORT [ALL or port number] FLOOD UPL

Example: [system name] ->set slot 2 port all flood upl

Vln (VLAN)

Unknown unicast, multicast and broadcast traffic (within the sender's VLAN range) is flooded to both the uplink ports and the interface ports.

[system name] ->SET SLOT [ALL or 1-12 for the IPD12000, ALL or 1-4 for the IPD4000, 1 for the Micro DSLAM] PORT [ALL or port number] FLOOD VLN

Example: [system name] ->set slot 2 port all flood vln

Priority

In compliance with the IEEE 802.1p Standard (a subset of 802.1Q), each port can be set with one of eight levels of prioritization designated numerically from 0 to 7: 0 denotes no priority and 7 denotes the highest priority. This allows packets coming from ports configured with higher priorities to scavenge bandwidth from lower priority ports if, or when, bandwidth becomes scarce.

If a port is configured with . . .	Then . . .
VLAN 0 (OFF)	The configured priority is irrelevant; the packet doesn't have VLAN tags.
A Single VLAN (Access Port)	The configured priority will automatically be added to the VLAN tag and Backbone-VLAN tag (if utilized).
One or more VLAN Ranges (Trunk Port)	The existing priority in the VLAN tag(s) and Backbone-VLAN tag (if utilized) will automatically be replaced with the configured priority.

Priority = 0 – 7
Default: 0 (no priority)

[system name] ->SET SLOT [ALL or 1-12 for the IPD12000, ALL or 1-4 for the IPD4000, 1 for the Micro DSLAM] PORT [ALL or port number] PRIORITY [0-7]

Example: [system name] ->set slot 4 port 3 priority 5

VLAN Range

Paradyne's IP DSLAMs and Micro DSLAMs comply with the Institute of Electrical and Electronics Engineers (IEEE) Standard for Local and Metropolitan Area Networks, specifically, the 802.1Q Virtual Bridge Local Area Networks Standard. VLAN (Virtual Local Area Network) tags are a packet's primary identification unless used in conjunction with a Backbone-VLAN tag. VLAN start and end tags indicate the 802.1Q VLAN tag range to be supported for each port. Depending on your Micro DSLAM or interface module model type, up to 10 VLAN ranges may be specified per port, each of which may be configured with VLAN 0, a single VLAN or VLAN range.

When configuring VLAN Range(s) for a port, both Start and End VLAN tags must be entered for ALL ranges, including single VLAN and VLAN OFF.

VLAN 0 / OFF (Default)

VLAN mode is OFF when all possible VLAN ranges are configured at zero. Only packets WITHOUT a designated VLAN tag are allowed to communicate across a port with VLAN OFF.

Packets coming from the . . .	With . . .	Will be . . .
WAN	No VLAN tag	Transmitted
	Any VLAN tag	Dropped
Uplink	No VLAN tag	Transmitted
	Any VLAN tag	Dropped

Starting VLAN tag=0
Ending VLAN tag=0

[system name] ->SET SLOT [ALL or 1-12 for the IPD12000, ALL or 1-4 for the IPD4000, 1 for Micro DSLAM] PORT [ALL or port number] VLAN_RANGE [1-10] 0-0

Example: [system name] ->set slot 5 port 3 vlan_range 1 0-0

Single VLAN / Access Port

Any port configured with a single VLAN tag is automatically designated as an 802.1Q VLAN Access Port; only packets with the specified VLAN tag will be allowed to communicate across that port.

Only one of a port's possible VLAN ranges may be set with a single tag for a port to be considered an Access Port. If more than one VLAN range is configured for a port, whether with single tags or ranges, the port automatically becomes a Trunk Port.

Packets coming from the . . .	With . . .	Will be . . .
WAN	No VLAN tag	Transmitted; the configured VLAN tag will automatically be added to the packet, prior to transmission, along with the configured VLAN ID, configured Priority and a zero [0] CFI bit.
WAN	Any VLAN tag	Dropped.
Uplink	No VLAN tag	Dropped.
Uplink	The specified VLAN Access tag	Transmitted; the VLAN tag will automatically be removed from the packet prior to transmission.
Uplink	A tag that does not match the configured VLAN Access tag	Dropped.

Starting VLAN tag = 1-4085
Ending VLAN tag = Starting VLAN tag

[system name] ->SET SLOT [ALL or 1-12 for the IPD12000, ALL or 1-4 for the IPD4000, 1 for the Micro DSLAM] PORT [ALL or port number] VLAN_RANGE [1-10] [(1-4085) - (1-4085)]

Example: [system name] ->set slot 5 port 3 vlan_range 1 100-100

VLAN Range / Trunk Port

A port set with one or more specified VLAN ranges will automatically be designated as an 802.1Q VLAN Trunk Port; only packets tagged within the specified VLAN range(s) will be allowed to communicate across that port. Up to 10 VLAN ranges may be specified per port on select Micro DSLAM and interface module models.

A port configured with more than one single VLAN tag is considered a Trunk Port, not an Access Port.

Packets coming from the . . .	**With . . .**	**Will be . . .**
WAN	No VLAN tag	Dropped
WAN	A VLAN tag within the specified trunk port range	Transmitted; the packet will retain its original VLAN tag, along with VLAN ID and CFI bit. The original Priority, however, will automatically be replaced with the DSLAM port's current Priority configuration.
WAN	A VLAN tag outside of the trunk port range	Dropped
Uplink	No VLAN tag	Dropped
Uplink	A VLAN tag within the specified trunk port range	Transmitted as is; the packet will retain its original tag configurations for VLAN ID, Priority and CFI bit.
Uplink	A VLAN tag outside of the trunk port range	Dropped

Starting VLAN tag = 1 - 4085
Starting VLAN tag < ending VLAN tag 4085

[system name] ->SET SLOT [ALL or 1-12 for the IPD12000, ALL or 1-4 for the IPD4000, 1 for the Micro DSLAM] PORT [ALL or port number] VLAN_RANGE [1-10] [(1-4085)-(1-4085)]

Example: [system name] ->set slot 5 port 3 vlan_range 1 100-250

ADSL Commands

ADSL is supported on the AAM8000 and AIM24000 interface modules and the AµD8000 micro DSLAM.

ADSL Encapsulation

ADSL data encapsulation specifies the framing method for carrying traffic over an ATM network, as defined by RFC 1483.

RFC1438-LLC

An AIM24000 port configured with Logical Link Control (LLC) encapsulation multiplexes multiple protocols over a single ATM virtual circuit.

RFC1483-VCM

An AIM24000 port configured with Virtual Circuit Multiplexing (VCM) creates a separate ATM Virtual Circuit connection for each protocol type, without additional encapsulation.

> [system name] ->SET SLOT [ALL or 1-12 for the IPD12000, ALL or 1-4 for the IPD4000, 1 for the Micro DSLAM] PORT [ALL or port number] ADSL_ENCAPSULATION [value]
>
> Example: [system name] ->set slot 2 port all adsl_encapsulation rfc1483-vcm

Default: RFC1438-LLC

ADSL Port Mode

Adaptive

A port set to a port mode of Adaptive will automatically train up to the best possible speed supported by the interface module or micro DSLAM, the ADSL modem at the remote end, and the copper cable pair connecting the two.

Fixed

A port set to a port mode of Fixed will maintain consistant upstream and downstream bandwidths as specified by the user.

Fixed Adaptive

A port set to port mode fixed adaptive will automatically train up to the best possible speed supported by the interface module or micro DSLAM, the ADSL modem at the remote end, and the copper cable pair connecting the two, within the confines of user-specified maximum upstream and downstream bandwidths.

Off

A port set to a port mode of Off has been administratively turned off.

[system name] ->SET SLOT [ALL or 1-12 for the IPD12000, ALL or 1-4 for the IPD4000, 1 for the Micro DSLAM] PORT [ALL or port number] ADSL_PORT_MODE [value]

Example: [system name] ->set slot 2 port all adsl_port_mode off

Default: Adaptive

ADSL Standard

Multimode

A port set to multimode detects and matches the standard mode of the remote ADSL modem to which it is connected.

G.DMT

G.DMT is ADSL technology in compliance with the standards of ITU-T Recommendation G.992.1.

G.lite

G.lite is ADSL technology in compliance with the standards of ITU-T Recommendation G.992.2. A port that is operating in G.lite mode and utilizing a single line for both phone and data requires an in-line splitter at the local end, and a microfilter at the remote end, of the ADSL connection.

T1.413

T1.413 is ADSL technology in compliance with the standards of the American National Standards Institute (ANSI) Standard T1.413.

Alcatel

Alcatel is ADSL technology and Alcatel ADSL modem compatible.

[system name] ->SET SLOT [ALL or 1-12 for the IPD12000, ALL or 1-4 for the IPD4000, 1 for the Micro DSLAM] PORT [ALL or port number] ADSL_STANDARD [value]

Example: [system name] ->set slot 2 port all adsl_standard g.lite

Default: Multimode

VPI and VCI

ADSL data travels by way of Asynchronous Transfer Mode (ATM) cells across Permanent Virtual Circuits (PVCs). Each PVC consists of one Virtual Channel across one Virtual Path as identified by a Virtual Channel Identifier (VCI) and a Virtual Path Identifier (VPI). A VPI is designated by an 8-bit field in ATM cell headers and a VCI is designated by a 16-bit field in ATM cell headers.

VPI

Valid values for VPI are in the range 0–255.

[system name] ->SET SLOT [ALL or 1-12 for the IPD12000, ALL or 1-4 for the IPD4000, 1 for the Micro DSLAM] PORT [ALL or port number] ADSL_VPI [value]

Example: [system name] ->set slot 2 port all adsl_vpi 0

Default: 0

VCI

Valid values for VCI are in the range 0–65535.

[system name] ->SET SLOT [ALL or 1-12 for the IPD12000, ALL or 1-4 for the IPD4000, 1 for the Micro DSLAM] PORT [ALL or port number] ADSL_VPI [value]

Example: [system name] ->set slot 2 port all adsl_vci 37

Default: 35

VPI/VCI Detect

VPI/VCI detection is a selectable function.

On

A port with VPI/VCI Detect on will automatically "snoop" the line to determine the VPI and VCI settings of the remote ADSL modem to which it is connected and set itself accordingly. If no ATM cells are detected (at any VPI/VCI setting), the port will default to VPI 0 and VCI 35. Thereafter, once it does detect ATM cells from the remote ADSL modem, it will reconfigure VPI and VCI to the same settings at which the ATM cells from the remote ADSL modem were detected.

Off

A port with VPI/VCI Detect off will default to VPI 0 and VCI 35 unless the port was previously set at VPI/VCI Detect on and had already detected the VPI and VCI settings of the remote ADSL modem. In this case, turning the VPI/VCI Detect function off will lock in the previously detected settings until, or unless, the VPI and VCI values are altered manually.

[system name] ->SET SLOT [ALL or 1-12 for the IPD12000, ALL or 1-4 for the IPD4000, 1 for the Micro DSLAM] PORT [ALL or port number] ADSL_VPI_VCI_DETECT [value]

Example: [system name] ->set slot 2 port all adsl_vpi_vci_detect off

Default: On

SDSL Commands

SDSL Line Code

SDSL Line Code refers to the method of line amplitude modulation for SDSL lines.

SDSL Line Code is currently configurable on SIM2000 interface modules and SDSL Micro DSLAMs only; it is hard set on all other Net to Net SDSL products. Additionally, line code applies to ALL ports on SIM2000s and Micro DSLAMs; it cannot be configured for individual ports.

G.SHDSL (Default)

Transmission Convergence/Pulse Amplitude Modulation (TC/PAM) line code is a sixteen-level PAM technique which incorporates advanced Trellis code, precoding, spectral shaping, equalization circuits and forward error correction. Otherwise known as G.SHDSL.

[system name] ->SET SLOT [ALL or 1-12 for the IPD12000, ALL or 1-4 for the IPD4000, 1 for the Micro DSLAM] PORT [ALL or port number] SDSL_LINE_CODING GSHDSL

Example: [system name] ->set slot 2 port all sdsl_line_coding gshdsl

2B1Q

Two Binary, One Quaternary (2B1Q) line code is a four-level PAM technique which reduces the signaling rate to half of the bit rate, thereby doubling transmission efficiency.

[system name] ->SET SLOT [ALL or 1-12 for the IPD12000, ALL or 1-4 for the IPD4000, 1 for the Micro DSLAM] PORT [ALL or port number] SDSL_LINE_CODING 2B1Q

Example: [system name] ->set slot 2 port all sdsl_line_coding 2b1q

CAP

Carrierless Amplitude and Phase (CAP) line code modulates transmit and receive signals into two wide-frequency bands that can pass throught a filter without being attenuated.

[system name] ->SET SLOT [ALL or 1-12 for the IPD12000, ALL or 1-4 for the IPD4000, 1 for the Micro DSLAM] PORT [ALL or port number] SDSL_LINE_CODING CAP

Example: [system name] ->set slot 2 port all sdsl_line_coding cap

Speed

The interface module or Micro DSLAM model type will determine the number of options and individual speeds available for each port. Setting speed to OFF will disable the port. See individual Interface Module User Guides and Micro DSLAM

Installation Instructions to obtain specific speed vs. distance capabilities and the default speed settings for each model. When configuring bandwidth, speed must be expressed in kbps and entered as a whole number followed by a "k".

Default: varies

[system name] ->SET SLOT [ALL or 1-12 for the IPD12000, ALL or 1-4 for the IPD4000, 1 for the Micro DSLAM] PORT [ALL or port number] SPEED [xxxxk, OFF]

Example: [system name] ->set slot 2 port all speed 528k

Show Commands

A Show command returns the current configuration of a requested parameter as identified by slot number, port number and/or parameter name. Enter Show commands as you would Set commands: simply replace the word Set with the word Show and exclude configuration values from the end of the command. The following parameter configurations can be requested with a Show command:

Backbone-VLAN	Inband Management	Speed
CLI Session Timeout	Inband MGMT VLAN ID	Subnet Mask
Default Gateway	IP Address	System Name
Firmware Version	Priority	VLAN Range
Flood	SDSL Line Coding	

Show Command Example

A request for the current speed configuration of all ports in Slot 5 of an IPD12000 would be entered as follows:

[system name] ->SHOW SLOT [ALL or 1-12 for the IPD12000, ALL or 1-4 for the IPD4000, 1 for the Micro DSLAM] PORT [ALL or port number] SPEED

Example: [system name] ->show slot 5 port all speed

A response to the above request would appear as follows:

Slot 5 Port 1 Speed = ____ kbps	The number of ports listed, and the speed shown for each port, depends upon the interface module model type in slot 5 and the current speed configuration as set for each port.
Slot 5 Port 2 Speed = ____ kbps	
Slot 5 Port 3 Speed = ____ kbps	
Slot 5 Port 4 Speed = ____ kbps	
Slot 5 Port 5 Speed = ____ kbps	
Slot 5 Port 6 Speed = ____ kbps	
Slot 5 Port 7 Speed = ____ kbps	
Slot 5 Port 8 Speed = ____ kbps	
Slot 5 Port 9 Speed = ____ kbps	
Slot 5 Port 10 Speed = ____ kbps	
Slot 5 Port 11 Speed = ____ kbps	
Slot 5 Port 12 Speed = ____ kbps	

Show All

The SHOW ALL command lists current system configurations; it does not list port configurations. The response varies slightly for an IPD12000 with two MUMs.

```
[system name] ->show
OR
[system name] ->show  all
```

Micro DSLAM, IPD4000 with a MUM2000-2 or IPD12000 with a MUM2000-2

The response to a SHOW ALL command for a Micro DSLAM, a MUM2000-2 in an IPD4000 (Slot 5) or one MUM2000-2 in an IPD12000 (either Slot 13 or Slot 14) will appear as follows:

Slot [1, 5, 13 or 14] MUM Version:	[x.xx.xx]
Mac Address:	[xx-xx-xx-xx-xx-xx]
IP Address / Subnet Mask:	[xxx.xxx.xxx.xxx] / [xxx.xxx.xxx.xxx]
Default Gateway:	[xxx.xxx.xxx.xxx]
Inband Management	[ON or OFF]
Inband Mgmt VlanID:	[1-4085]
Allow Management from:	[xxx.xxx.xxx.xxx to xxx.xxx.xxx.xxx]
Web Server:	[Enabled or Disabled]
TFTP Server:	[Enabled or Disabled]
Telnet:	[Enabled or Disabled]
Cli Session Timeout:	[xxx]

IPD12000 with two MUM2000-2s

The response to a SHOW ALL command for an IPD12000 with two MUM2000-2s will list select system configuration data for both MUMs. Allow Management from, Web Server, TFTP Server and Telnet data, however, will only be listed for the ACTIVE MUM (the MUM that you are logged into).

Example: If there are two MUM2000-2s in your IPD12000 and you are logged into the system via the MUM in Slot 13, the SHOW ALL response would appear as follows:

Slot 13 MUM Version:	[x.xx.xx]
Mac Address:	[xx-xx-xx-xx-xx-xx]
IP Address / Subnet Mask:	[xxx.xxx.xxx.xxx] / [xxx.xxx.xxx.xxx]
Default Gateway:	[xxx.xxx.xxx.xxx]
Inband Management	[ON or OFF]
Inband Mgmt VlanID:	[1-4085]
Allow Management from:	[xxx.xxx.xxx.xxx to xxx.xxx.xxx.xxx]
Web Server:	[Enabled or Disabled]
TFTP Server:	[Enabled or Disabled]
Telnet:	[Enabled or Disabled]
Cli Session Timeout:	[xxx]
Slot 14 MUM Version:	[x.xx.xx]
Mac Address:	[xx-xx-xx-xx-xx-xx]
IP Address / Subnet Mask:	[xxx.xxx.xxx.xxx] / [xxx.xxx.xxx.xxx]
Default Gateway:	[xxx.xxx.xxx.xxx]
Inband Management	[ON or OFF]
Inband Mgmt VlanID:	[1-4085]

Firmware Version

Firmware Version functions only as a SHOW command and cannot be entered as a SET command.

[system name] ->SHOW SLOT [ALL or 1-12 for the IPD12000, ALL or 1-4 for the IPD4000, 1 for the Micro DSLAM] PORT [ALL or port number] FIRMWARE_VERSION

Example: [system name] ->show slot 5 port all firmware_version

A response to the above request would appear as follows:

Slot 5 Port 1 MUX Version: ____,CONV Version: ____,
Slot 5 Port 2 MUX Version: ____,CONV Version: ____,
Slot 5 Port 3 MUX Version: ____,CONV Version: ____,
Slot 5 Port 4 MUX Version: ____,CONV Version: ____,
Slot 5 Port 5 MUX Version: ____,CONV Version: ____,
Slot 5 Port 6 MUX Version: ____,CONV Version: ____,
Slot 5 Port 7 MUX Version: ____,CONV Version: ____,
Slot 5 Port 8 MUX Version: ____,CONV Version: ____,
Slot 5 Port 9 MUX Version: ____,CONV Version: ____,
Slot 5 Port 10 MUX Version: ____,CONV Version: ____,
Slot 5 Port 11 MUX Version: ____,CONV Version: ____,
Slot 5 Port 12 MUX Version: ____,CONV Version: ____,

The number of ports listed, and the firmware versions shown for each port, depend upon the interface module model type in slot 5.

Independent Commands

The following CLI commands are used independently of the SET and SHOW commands.

Allow

Specifies the IP Address(es) from which a DSLAM may be remotely managed.

DSLAMs are always manageable via a direct physical connection with the MUM2000-2 or Micro DSLAM COM (Communication) port, regardless of management IP Address specifications.

[system name] ->ALLOW [ALL, ip_address or ip_address ip_address]:

All IP Addresses (Default)

[system name] ->allow
OR
[system name] ->allow 0.0.0.0 - 255.255.255.255

IP Address Range

[system name] ->allow [ip_address] - [ip_address]

Example: [system name] ->allow 193.166.254.1 - 193.166.254.254

Single IP Address

[system name] ->allow [ip_address]

Example: [system name] ->allow 193.166.254.102

COM (Communication) Port Only

[system name] ->allow 0.0.0.0

Each ALLOW command entered overwrites all previously entered ALLOW commands.

Clear NVRAM

CAUTION: Clearing Micro DSLAM or MUM2000-2 NVRAM restores ALL system and port configurations to original default settings including IP Address, Subnet Mask and Gateway. Additionally, Inband Management will revert to its original default setting (OFF) and you will be required to establish a direct connection with your DSLAM for any subsequent configurations.

NVRAM cannot be cleared remotely via Telnet; your PC must be directly connected to the Micro DSLAM or MUM2000-2 COM Port. Once the Clear NVRAM command has been entered, the process will take approximately one [1] minute to complete and you will be required to log back in for any subsequent configurations.

```
[system name] ->clear_nvram
```

Disable Telnet

Disallows remote DSLAM management with CLI (via Telnet).

```
[system name] ->disable_telnet
```

Disable TFTP

Disables the option to download firmware upgrades, and to save system and port configurations to local files.

```
[system name] ->disable_tftp
```

Disable Web Server

Disallows DSLAM management via NMS.

```
[system name] ->disable_web_server
```

Enable Telnet (Default)

Allows up to nine remote users to manage a DSLAM with CLI (via Telnet).

In order to remote manage a DSLAM via CLI, Inband Management must also be enabled.

```
[system name] ->enable_telnet
```

Enable TFTP (Default)

Enables Trivial File Transfer Protocol (TFTP), allowing both system and port configurations to be saved on your PC or local network as a backup and/or for use as a template for future condfigurations (Section 1.4.2). TFTP also enables download of firmware upgrades to your DSLAM (see the firmware upgrade procedure for your device).

```
[system name] ->enable_tftp
```

Enable Web Server (Default)

Allows DSLAM management via Paradyne's Network Management System (NMS). See the NMS Management User Guide.

```
[system name] ->enable_web_server
```

Help

The HELP command returns a list of CLI command possibilities.

```
[system name] ->help
OR
[system name] ->?
```

A response to either of the above HELP Commands might appear as follows:

```
Usage:  [?, CLEAR_NVRAM, HELP, LOGOUT, WHO]
        [DISABLE_TELNET, DISABLE_TFTP, DISABLE_WEB_SERVER]
        [ENABLE_TELNET, ENABLE_TFTP, ENABLE_WEB_SERVER]
        allow  [ALL, IP_ADDRESS  [IPADDRESS]]
        [SET, SHOW]  [CLI_SESSION_TIMEOUT, SYSTEM_NAME]
        [SET, SHOW]  SLOT  [ALL, slotnumber]  [PORT]  [ALL, portnumber]  ITEM VALUE

Slot is MANDATORY for all SET/SHOW commands
```

ITEMS	VALUES
ALLOW	Allow IP_Address [IP_ADDRESS] (for mgmt)
BACKBONE_VLAN	[0-4085]
CLEAR_NVRAM	Reboots the unit and restores factory defaults
CLI_SESSION_TIMEOUT	Changes the CLI Session Inactivity Timeout
DEFAULT_GATEWAY	xxx.xxx.xxx.xxx
DISABLE_TELNET	Disables TELNET Capabilities
DISABLE_TFTP	Disables TFTP Server
DISABLE_WEB_SERVER	Disables the web server interface (NMS)
ENABLE_TELNET	Enables TELNET Capabilities

ENABLE_TFTP	Enables TFTP Server
ENABLE_WEB_SERVER	Enables the web server interface (NMS)
FIRMWARE_VERSION	Displays the firmware version
FLOOD	[UPL, VLN]
GENERAL_PASSWORD	You will be prompted for values
INBAND_MANAGEMENT	[ON, OFF]
INBAND_MGMT_VLAN_ID	[0-4085]
IP_ADDRESS	xxx.xxx.xxx.xxx
LOGOUT	Logs user out of CLI
PRIORITY	[0-7]
RESET	
SDSL_LINE_CODING	[GSHDSL, CAP, 2B1Q]
SNMP_READONLY_COMMUNITY	You will be prompted for values
SNMP_READWRITE_COMMUNITY	You will be prompted for values
SPEED	[XXXXk, OFF] where XXXX = speed (in kbps)
SUBNET_MASK	xxx.xxx.xxx.xxx
SUPERUSER_PASSWORD	You will be prompted for values
SYSTEM_NAME	Changes the DSLAM System Name and CLI Prompt
VLAN_RANGE	VLAN_RANGE: SHOW=[ALL, 1-10], SET=[1-10] VLAN_ID: [0-4085]-[0-4085]
WHO	Who's logged on

Logout

Logs users out of the DSLAM management system.

```
[system name] ->logout
```

Reset

Resets (reboots) the Micro DSLAM or IP DSLAM interface module(s), clearing RAM and restoring all port configurations to original default settings. Resetting the DSLAM does NOT clear NVRAM; system settings will remain as configured. A system reset takes approximately one [1] minute to complete, after which you will be required to log back in.

```
[system name] ->reset
```

Who

Returns the IP Addresses of all users currently logged on to the management system through CLI and specifies whether each user is a Superuser or General User. Also specifies which user, if any, is logged on via a direct connection through the DSLAM COM port (as opposed to remote connections via Telnet).

```
[system name] ->who
```

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